

CLAIMS

1. (Amended) A chip comprising:

a substrate;

a sample introduction unit provided on said substrate;

a channel which is communicated with said sample introduction
5 unit;

a separation unit which includes a part of said channel, and
separates components in a liquid sample introduced in said sample
introduction unit;

a pretreatment unit which is provided at upstream of said
10 separation unit, and which applies predetermined pretreatment to
said liquid sample introduced in said sample introduction unit; and

an analysis unit which analyzes said components separated in
said separation unit,

wherein said pretreatment unit includes a pretreatment
15 reservoir, and a switch which is provided at downstream of said
pretreatment reservoir, and which controls to supply said liquid
sample from said pretreatment unit to said separation unit, and

said switch has a damming portion which dams up liquid in said
pretreatment reservoir, and a trigger channel which is communicated
20 with said channel at said damming portion or downstream side of said
damming portion, and which introduces said liquid to said damming
portion.

2. (Amended) The chip according to claim 2,

wherein said liquid sample includes insoluble components, and

said pretreatment reservoir has solubiliing substance solubiliing said insoluble components.

3. (Amended) The chip according to claim 1 or 2,
wherein processing in said pretreatment unit is lowering viscosity of said liquid sample.

4. (Amended) The chip according to claim 1 or 2,
wherein processing in said pretreatment unit is mixing said liquid sample and a surface active agent.

5. (Amended) The chip according to any one of claims 1 to 4,
comprising a mixing unit which is communicated with said separation unit and said analysis unit, and which homogenizes a concentration of said components in a liquid including said components separated
5 in said separation unit.

6. (Amended) The chip according to any one of claims 1 to 5,
wherein said mixing unit carries out processing which homogenizes a concentration of said components in a liquid including said components separated in said separation unit; and
5 said analysis unit analyzes said components in said liquid including said components homogenized in said mixing unit.

7. (Amended) The chip according to claim 5 or 6,
wherein said mixing unit has a structure in which one region of said channel and other regions are communicated with one another

via micro channels.

8. (Amended) The chip according to claim 5 or 6,

wherein said mixing unit is composed of a counter-channel to said sample and a confluent portion.

9. (Amended) The chip according to claim 5 or 6,

wherein said mixing unit includes a switch which is provided at said channel, and which controls to supply said liquid sample from said mixing unit to said analysis unit, and

5 said switch has a damming portion which dams up liquid in said channel, and a trigger channel which is communicated with said channel at said damming portion or an area of downstream side of said damming portion, and which introduces said liquid to said damming portion.

10. (Amended) The chip according to any one of claims 5 to 9,

wherein said mixing unit has a movement control unit which controls a timing in which said liquid sample moves to said analysis unit, and said movement control unit is configured to introduce said
5 liquid sample to said analysis unit after retaining said liquid sample for a predetermined time.

11. (Amended) The chip according to claim 10,

wherein said movement control unit includes a switch which controls to supply said liquid sample from said mixing unit to said analysis unit, and

5 said switch has a damming portion which dams up liquid in said

channel, and a trigger channel which is communicated with said channel at said damming portion or an area of downstream side of said damming portion, and which introduces said liquid to said damming portion.

12. (Amended) The chip according to claim 11,

wherein said trigger channel includes a time-lag channel which delays a timing in which said liquid sample moves to said analysis unit by retaining said liquid sample.

13. (Amended) The chip according to claim 11,

wherein a time-lag reservoir which delays a timing in which said liquid sample moves to said analysis unit by retaining said liquid sample is provided at said trigger channel.

14. (Amended) The chip according to any one of claims 1 to 13, comprising a reaction unit which makes said components separated in said separation unit cause a predetermined reaction.

15. (Amended) A chip comprising:

a substrate;

a sample introduction unit provided on said substrate;

a channel which is communicated with said sample introduction

5 unit;

a separation unit which includes a part of said channel, and which separates components in a liquid sample introduced in said sample introduction unit;

a reaction unit which makes said components separated at said

10 separation unit cause a predetermined reaction; and

an analysis unit which analyzes said components separated in said separation unit.

16. (Amended) The chip according to claim 14 or 15,

wherein said reaction unit includes a reaction reservoir and a switch which is provided at downstream of said reaction reservoir, and

5 said switch has a damming portion which dams up liquid in said reaction reservoir, and a trigger channel which is communicated with said channel at said damming portion or an area of downstream side of said damming portion, and which introduces said liquid to said damming portion.

17. (Amended) The chip according to claim 16, comprising a reacting substance affecting said components in said liquid sample, in said reaction reservoir.

18. (Amended) The chip according to any one of claims 1 to 17, comprising a seal which covers a surface of said substrate.

19. (Amended) The chip according to claim 18,

wherein an inert gas is filled in a space formed by said substrate and said seal.

20. (Amended) The chip according to claim 18,

wherein a pressure is reduced in said space formed by said

substrate and said seal.

21. (Amended) The chip according to any one of claims 1 to 20, wherein said surface of said substrate is made of a hydrophilic resin.

22. (Amended) The chip according to any one of claims 1 to 21, wherein said separation unit includes a switch which moves said liquid sample introduced in said sample introduction unit to said channel at a predetermined timing.

23. (Amended) The chip according to any one of claims 1 to 22, wherein said separation unit has a plurality of columnar bodies provided in said channel.

24. (Amended) The chip according to any one of claims 1 to 22, wherein said separation unit has a plurality of concave portions provided in said channel.

25. (Amended) The chip according to any one of claims 1 to 22, wherein surfaces of said channel which structure said separation unit has a plurality of first regions arranged so as to be separated each other, and a second region occupying the surface
5 of said separation unit other than said first regions, and
between said first regions and said second region, one is a hydrophobic region, and the other one is a hydrophilic region.

26. (Amended) The chip according to any one of claims 1 to 22,
wherein said separation unit has sample adsorbing particles
which develop said liquid sample in accordance with a specific
property.

27. (Amended) The chip according to any one of claims 1 to 22,
wherein a bank unit is provided on the bottom face of said
channel structuring said separation unit along a traveling direction
of said channel so as to divide said channel, and a height of said
5 bank unit is lower than a depth of said channel.

28. (Amended) The chip according to any one of claims 1 to 22,
comprising
a cover which covers said separation unit,
wherein on a plane at said substrate side among the planes
5 of said cover, a bank unit is provided along the traveling direction
of said channel so as to divide said channel, and
a height of said bank unit is lower than a depth of said channel.

29. (Amended) The chip according to claim 28,
wherein said bank unit is a resin film formed on said plane
at said substrate side of said cover.

30. (Amended) The chip according to any one of claims 1 to 22,
wherein said separation unit includes a first channel forming
a part of said channel, a second channel through which a liquid
including specific components separated from said liquid sample

5 passing through said channel passes, and a separation channel which makes said first channel and said second channel be communicated with one another, and through which only specific components are made to pass.

31. (Amended) The chip according to any one of claims 1 to 30, wherein said analysis unit has a plurality of reservoirs into which said components are sorted.

32. (Amended) The chip according to claim 31, comprising air holes at said reservoirs or in the vicinity of said reservoirs of said channel communicated with said reservoirs.

33. (Amended) The chip according to claim 32, wherein a surface at a periphery of said air holes is made hydrophobic.

34. (Amended) The chip according to any one of claims 1 to 33, wherein said analysis unit has a detection unit which detects said components.

35. (Amended) The chip according to claim 34, further comprising a covering member which covers said detection unit, wherein said covering member and a micro lens are integrally formed.

36. (Amended) The chip according to any one of claims 1 to 35, comprising a waste reservoir communicated with said channel

downstream of said analysis unit, wherein said liquid in said channel is configured to move toward a downstream side of said channel
5 accompanying a movement of said liquid to said waste reservoir.

37. (Amended) The chip according to claim 36,
wherein a liquid retaining portion is provided at said waste reservoir.

38. (Amended) The chip according to claim 36 or 37, comprising air holes in said waste reservoir or in the vicinity of said waste reservoir of said channel communicated with said waste reservoir.

39. (Amended) The chip according to claim 38,
wherein said surface in said periphery of the air holes is made hydrophobic.

40. (Amended) The chip according to any one of claims 31 to 39,
wherein said channel has a branched portion, and said branched portion is communicated with said plurality of reservoirs.

41. (Amended) The chip according to any one of claims 1 to 40,
wherein said liquid sample is configured to move in said channel by a capillary phenomenon.

42. (Amended) The chip according to any one of claims 1 to 41,
wherein said separation unit has particles aggregating by being specifically adsorbed to predetermined components in said

liquid sample.

43. (Amended) The chip according to claim 42,

wherein said separation unit includes a particle retaining reservoir retaining said particles, and a switch which controls movement of said particles from said particle retaining reservoir
5 to said channel, and

said switch has a damming portion which dams up said particles in said particle retaining reservoir, and a trigger channel which is communicated with said channel at said damming portion or downstream thereof, and which introduces said particles to said
10 damming portion.

44. (Amended) The chip according to claim 42 or 43,

wherein said analysis unit has a channel for analysis which is communicated with said separation unit, and a window unit which is provided above said channel for analysis of said substrate, and
5 through which a aggregated state of said particles is sensed.